

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Reinforcing steel (rods and mesh) for cast-in-place concrete.
 - 2. Accessories such as chairs and tie wires.

1.2 SUBMITTALS

- A. Procedure: In compliance with Division 1.
- B. Shop drawings: Submit for reinforcement deviating from that shown on the Drawings.
 - 1. Submit bar drawings and schedules with the corresponding placing diagrams. Drawings shall be complete for any specific area of Project when submitted.
 - 2. Reinforcing shop fabrication and field placement drawings shall be submitted in an acceptable form, be checked and complete. Reuse of the Contract Documents is not permitted. Each submittal shall be provided at least five weeks in advance of reinforcing delivery to site.
 - 3. Reinforcement shall be detailed based on construction joint locations that have been shown on shop drawings, as reviewed. Construction joints shall be indicated on reinforcing shop drawings. Submit proposed construction joints for review prior to submittal of reinforcing shop drawings.
 - 4. The drawings shall be in such detail as to assure that there will be a minimum, if any, of difficulties in execution of the work in the field. Show layout of reinforcing by mark for each member on plan. For each member or collinear series of members, show side elevation of the member with top, bottom and tie reinforcing and spacings shown. Show cross section of each pertinent location. Show all bar lengths and dimensioned bar bending details for each bar type. The detailed bar listing shall be shown on a member-by-member basis indicating the number of bars of each type etc. Clearly show splicing and placing conditions at each splice area. Detail pilaster verticals with respect to beam, and anchor bolts. Placement diagrams shall clearly indicate locations of beam reinforcing passing through verticals and anchor bolts. Placement diagrams shall clearly show layering of beam reinforcement and slab reinforcement locations relative to beams. Walls shall be shown in side elevations of each wall face indicating vertical, horizontal and beam reinforcing with sections showing placement.
 - 5. The drawings shall consist of sections, plans and details clearly showing locations, sizes and spacing of all reinforcing steel, supporting bars and accessories. Include particular details at beam-column intersections showing locations of vertical and horizontal reinforcing. Include detailed schedules and diagrams to indicate bends, sizes and lengths of all reinforcing steel items and clear cover for reinforcing.
 - 6. Floor openings, wall openings, wall recesses and sleeves for all mechanical, plumbing and electrical work shall be coordinated with the respective trades and reinforcing shown on these drawings in accordance with the criteria indicated on the drawings.
 - 7. After review, furnish all copies needed for fabrication and erection, and for the coordination and use of other trades.

- 8. Be fully responsible for furnishing and installing all materials called for or required by the Contract Documents even though these materials may have been omitted from the reviewed shop drawings or incorrectly indicated thereon.
- C. Mill reports: Submit copies of mill reports and test data for reinforcing steel sampled and tested, prior to starting this work.
- D. Proprietary splicing details.
- E. Mill Certificates: Submit to Architect, two (2) copies of manufacturer's certificates of reinforcing steel mill tests.
- F. Provide alignment templates at top of pilaster cage to maintain position of vertical bars such that the proper location of beam bars passing through the pilaster and anchor bolts is assured.

1.3 QUALITY ASSURANCE

- A. Source quality control: Obtain mill reports for all types and sizes of reinforcing steel.
 - 1. Mill reports shall contain the steel source, description, heat number, yield point, ultimate tensile strength, elongation percentage, bend test and chemical analysis.
 - a. If the reports show that material is satisfactory, no tests will be required.
 - b. For foreign steel, testing as specified below will be required by a testing laboratory acceptable to the Architect.
 - c. For foreign steel, testing as specified below will be required by a testing laboratory acceptable to the Architect.
 - 2. Ensure that the material delivered for use is that represented by the mill reports and obtain copies of mill reports, examine them, certify whether the material represented complies with Specifications requirements, and make distribution of reports as required. Report chemical composition of each heat, as determined by ladle analysis.
 - 3. Where materials proposed for use cannot be identified, pay for an approved testing laboratory to make one series of tests (tensile and bend) from each 2.5 tons, or fraction thereof, of each size and kind of reinforcing steel. Include 2 samples, minimum, of sufficient length to allow tests to be made on the as-rolled bar.

1.4 HANDLING

- A. Procedure: In compliance with Section 01600.
- B. Electrode storage: Comply with the combined recommendations of AWS and the electrode manufacturer for storage of electrodes. Do not use electrodes that have been wetted.
- C. Delivery: Deliver reinforcement to the site bundled, tagged and marked; handle to prevent damage to material. Use metal tags indicating size, length and other markings shown on placement drawings. Maintain tags after bundles are broken.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing steel: Use ASTM A 615, Grade 60 for gravity elements. Use ASTM A 706, Grade 60 for primary reinforcing in moment frame columns, beams and shear wall boundary elements. For welding, conform to specified carbon equivalent or use bars conforming to ASTM A 706.

- B. Reinforcing mesh: ASTM A 185. Provide welded wire fabric in flat sheets, not rolls.
- C. Welding electrodes: AWS A5.1 E70XX Series, low hydrogen, having a minimum yield point of 60,000 psi.
- D. Tie wire: ASTM A 82, 16 gage (minimum) annealed steel wire.
- E. Supports for reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs, or pre-cast concrete block chairs with embedded wire ties.
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
 - 3. Over waterproof membranes and vapor barriers, use pre-cast concrete chairs to prevent puncturing of membrane.

2.2 FABRICATION

- A. General: Except as modified by the Drawings and the Specifications, comply with Chapter 7 of CRSI Manual of Standard Practice for fabrication of reinforcing steel. Exposed Sealing Materials: All sealing materials exposed at entrance and storefront perimeter joints in contact with adjacent cladding materials: 2 component silicone, refer to Division 7 Section "Joint Sealants".
- B. Bending and forming:
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs, or pre-cast concrete block chairs with embedded wire ties.
 - 2. Heating reinforcement for bending is prohibited. Do not install bars with unscheduled kinks or bends.
- C. Tolerances: Comply with ACI 117.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate surfaces to receive concrete reinforcement and associated work and conditions under which work will be installed. Do not proceed until satisfactory conditions have been corrected in a manner complying with the Contract Documents and acceptable to the Installer. Starting of the work within a particular area will be construed as Installer's acceptance of surface conditions.

3.2 PLACING

- A. Placement inspection: Place reinforcement under the continuous inspection of the Owner's Testing Agency.
- B. Cleaning: Clean reinforcement of loose mill scale, excessive rust, oil, and other coating that might destroy or reduce its bond before placing it.
- C. Placing: Comply with the listed reference standards as applicable.
 - 1. ACI 315, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - 2. CRSI, Manual of Standard Practice.
 - 3. AWS D1.4, Structural Welding Code - Reinforcing Steel.

- D. Spacing of reinforcement: Space reinforcement to maintain the proper distance and clearance between parallel bars and between bars and forms.

3.3 WELDING

- A. Welding: Comply with the requirements of AWS D1.4. Before welding, determine the weldability of reinforcing bars by laboratory chemical analysis of the steel. Only steel conforming to the chemical requirements specified in AWS D1.4 may be welded.
- B. Welded splices: Use full penetration butt welds made by the electric-arc method unless indicated otherwise.
 - 1. Use only welders who have passed the AWS standard qualification tests within the previous year.
 - 2. Weld splices shall develop 125% of the specified yield strength of the reinforcing bars, or of the smaller bar in transition splices.
 - 3. Clean bars of oil, grease, dirt and other foreign substances, and flame-dry before welding.
 - 4. Prepare ends of bars in compliance with AWS D1.4. Preheat bars before welding.

END OF SECTION